



Aug. - 1987 EAC-420110-156

# Rocky Flats Plant

## Monthly Environmental Monitoring Report

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RR-RP-00238



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A Prime Contractor to  
The United States Department of Energy

Reviewed for Classification/UCNI/OUO  
By: Janet Nesheim, Derivative Classifier  
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Date: 1/17/08 KB  
Confirmed Unclassified, Not UCNI/Not OUO

ADMIN RECORD  
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SW-A-003634

1/29

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AUGUST 1987 ENVIRONMENTAL MONITORING REPORT  
ROCKY FLATS PLANT

This report summarizes the effluent and environmental monitoring programs at the Rocky Flats Plant for the month of August, 1987.

Included in the report are monitoring results for radioactive and nonradioactive airborne effluents continuously sampled from Plant buildings, Tables I and II. Tables III through VI summarize environmental monitoring data from the Rocky Flats Plant ambient air sampling network. This network is comprised of continuously operating air samplers located on plantsite, around the Plant boundary, and in neighboring communities.

Water sampling results for radioactive constituents are given in Tables VII through IX. Results are summarized for Plant surface water control ponds, for nearby drinking water reservoirs, and for tap water for neighboring communities. Nitrate monitoring for Great Western Reservoir and Standley Lake, the two drinking water reservoirs which can receive surface water discharges from the Plant, are summarized in Table X.

The Environmental Protection Agency (EPA) has issued to the Plant a National Pollutant Discharge Elimination System (NPDES) permit for control of surface water discharges. Water sampling results associated with the NPDES permit, as well as applicable discharge limitations imposed by that permit, are reported in Table XI. Daily flow data for surface water from the two Plant drainage systems are given in Tables XII and XIII.

The Rocky Flats Plant Environmental Monitoring Program includes evaluating plant compliance with all relevant guides, limits, and standards. All average results of monitoring effluent and ambient samples complied with the applicable standards as specified in Executive Order 12088 (rules, regulations, and requirements of the Department of Energy).

The data provided in this report are provided as a matter of comity and should not be construed as an application for a permit or license, or in support of such an application. Approval of the Department of Energy should be obtained prior to publication of any data contained within this report.

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Name/Org: Shyng/Ag/PRC Date 11/17/08  
Directed By: J.A. Neshem DOE M471.3-1

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Table I. 1987 Plutonium and Uranium Airborne Effluent Data

Month	Plutonium		Uranium	
	Release (uCi)	CMax (pCi/m3)	Release (uCi)	CMax (pCi/m3)
CY 1986	14.33	0.047 ± 0.0082	21.24	0.133 ± 0.0152
January	1.39	0.095 ± 0.0155	2.15	0.017 ± 0.0013
February	0.89	0.071 ± 0.0081	1.99	0.095 ± 0.0091
March	1.84	0.229 ± 0.0278	1.12	0.005 ± 0.0004
April	2.02	0.016 ± 0.0013	0.87	0.004 ± 0.0005
May	1.28	0.104 ± 0.0175	0.94	0.003 ± 0.0004
June	0.69*	0.005 ± 0.0012	0.98	0.003 ± 0.0004
July	1.22**	0.019 ± 0.0021**	1.21**	0.004 ± 0.0005**
August	0.65	0.010 ± 0.0011	1.91	0.006 ± 0.0008
September				
October				
November				
December				
Year to Date	9.98	0.229 ± 0.0278	11.17	0.095 ± 0.0091

NOTE: Beginning in January 1981, the plutonium, uranium, americium, and beryllium measured concentrations have been reported. These reported concentrations include values that are less than the corresponding calculated MDC's and in some cases, values less than zero. These negative values result when the measured value for the laboratory reagent blank is subtracted from an analytical result which was measured as a smaller value than the reagent blank. This may happen when measuring concentrations which are very close to zero.

\* Estimated June plutonium emissions are included for 12 of 37 sampling locations because of low chemical recoveries for those samples. Estimated June plutonium emissions are based on measured air emissions for 25 sampling locations (contributing 0.60 uCi total) and six-month averages for the 12 affected locations (contributing an additional 0.09 uCi total).

\*\* Previously reported as incomplete data.

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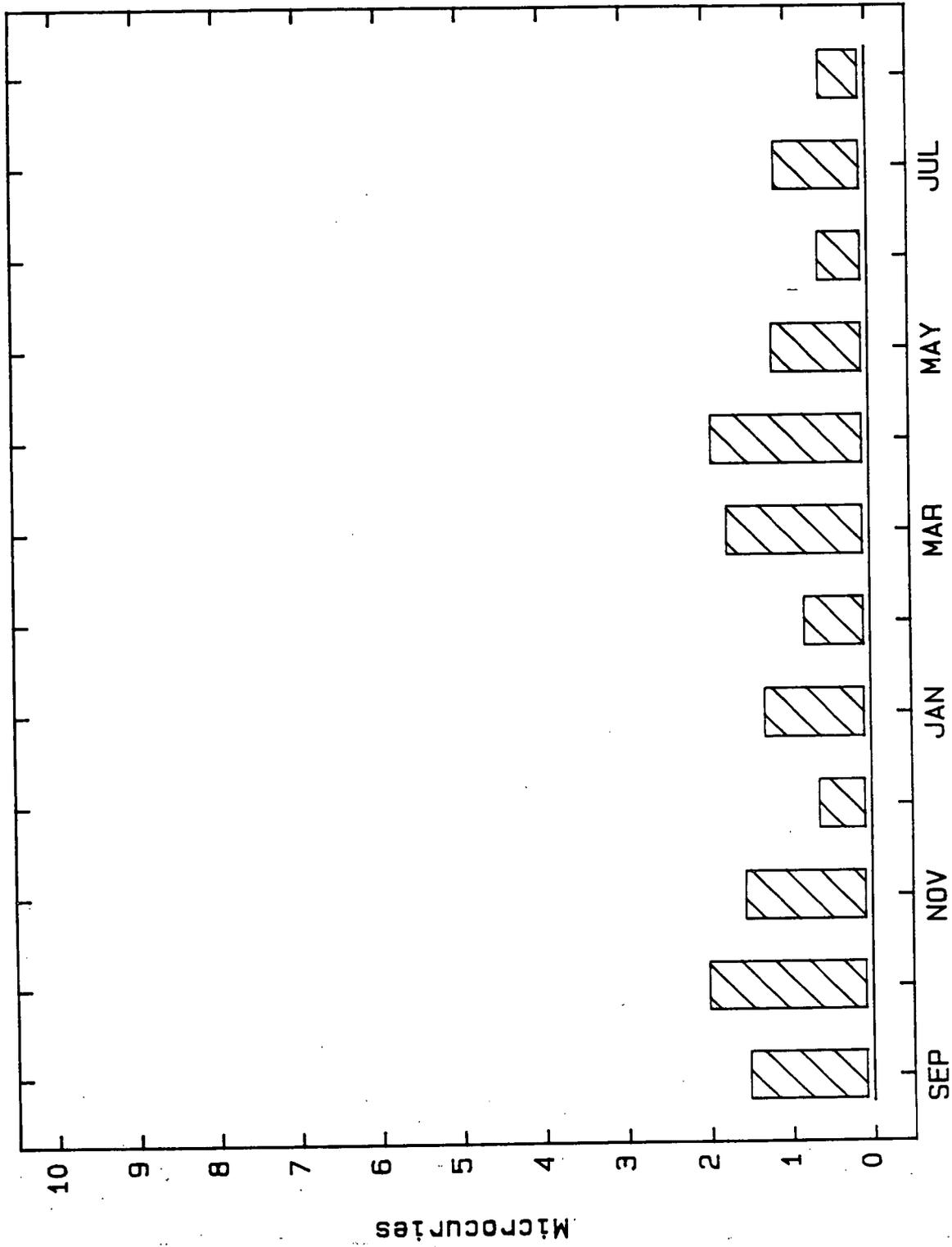
Table II. 1987 Tritium and Beryllium Airborne Effluent Data

Month	Tritium		Beryllium	
	Release (Ci)	CMax (pCi/m3)	Release (gms)	CMax (ug/m3)
CY 1986	0.218	36700 ± 950	0.1299	0.00053
January	0.005	410 ± 180	0.0276	0.00042
February	0.008	250 ± 80	0.0085	0.00006
March	0.004	470 ± 180	0.0091	0.00014
April	0.007	270 ± 60	0.0130	0.00010
May	0.013	560 ± 210	0.0143	0.00011
June	0.005	260 ± 60	0.0137	0.00014
July	0.013	420 ± 160	0.0099	0.00008
August	0.025	3402 ± 570	0.0207	0.00021
September				
October				
November				
December				
Year to Date	0.080	3402 ± 570	0.1168	0.00042

NOTE: Beryllium measured at the remaining 36 locations was below the screening level of 0.1 gram per month.

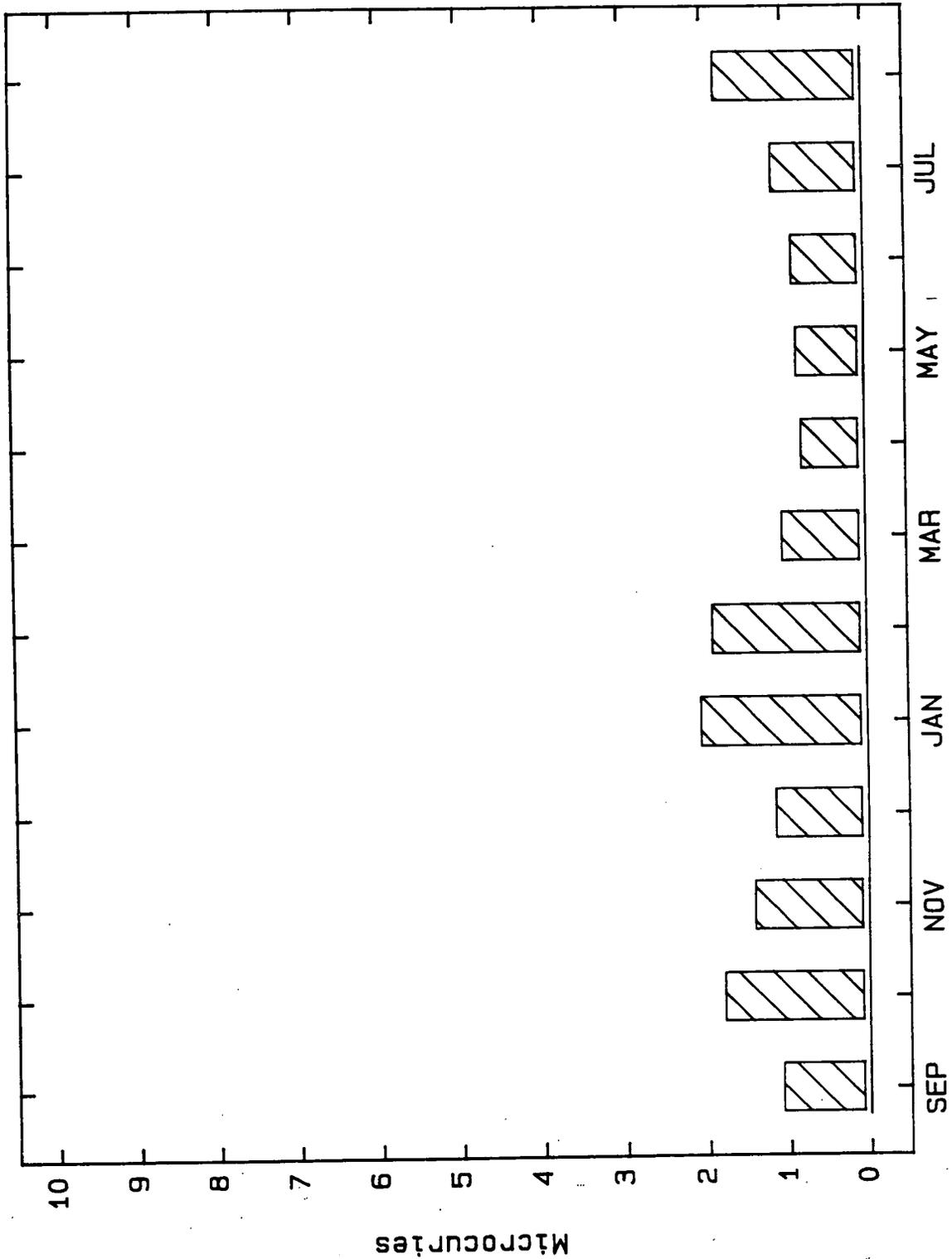
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PLUTONIUM MEASURED IN EFFLUENT AIR



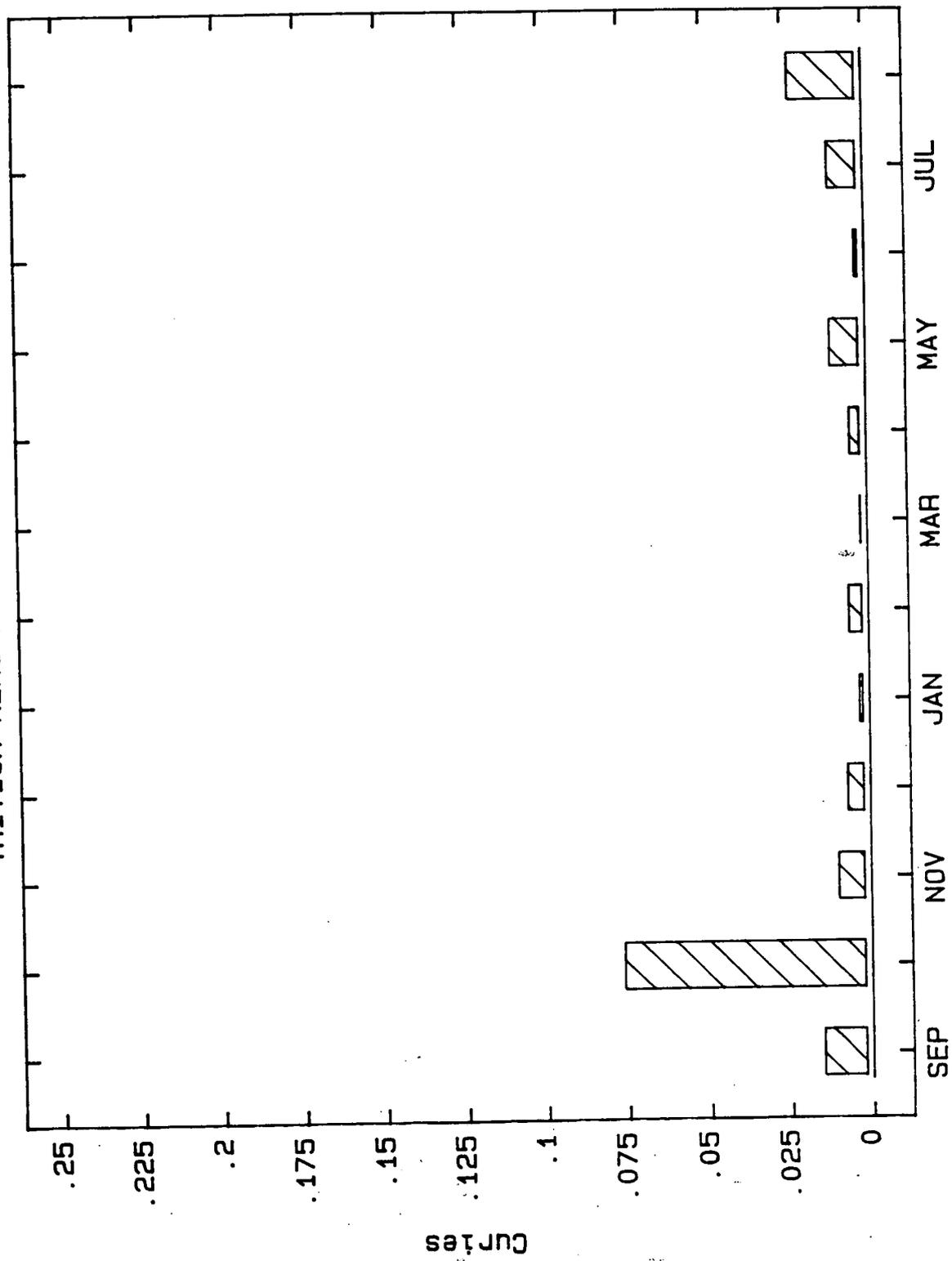
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URANIUM MEASURED IN EFFLUENT AIR



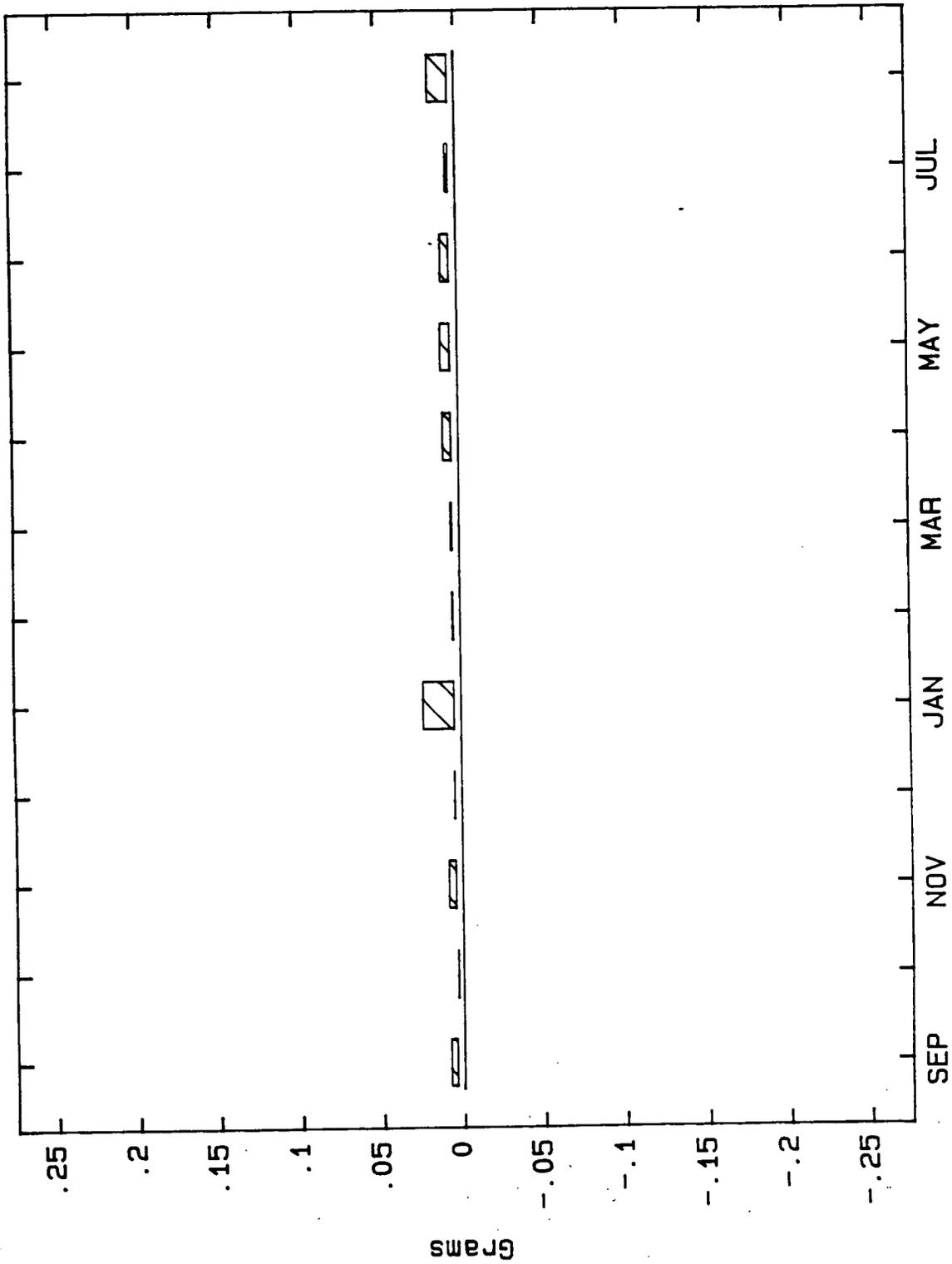
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TRITIUM MEASURED IN EFFLUENT AIR



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BERYLLIUM MEASURED IN EFFLUENT AIR



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Table III. Plutonium at Selected Onsite Ambient Air Locations  
(07/28/87-08/25/87)

Location	n	Volume(m <sup>3</sup> )	Concentration (pCi/m <sup>3</sup> )		
			Lower Confidence Limit	Point Estimate	Upper Confidence Limit
S-05	2	16,000	0.000047	0.000059	0.000071
S-06	2	29,000	0.000016	0.000022	0.000028
S-07	2	29,000	0.000497	0.000561	0.000625
S-08	2	26,000	0.000892	0.000995	0.001098
S-09	2	30,000	0.001317	0.001477	0.001637

NOTE: Total long-lived alpha at the remaining 18 onsite ambient air samplers was below the screening level of 0.01 pCi/m<sup>3</sup>.

Table IV. Tritium in Ambient Air  
(07/28/87 to 09/01/87)

Location	n	Air Volume(m <sup>3</sup> )	Point Estimate (pCi/m <sup>3</sup> )	+/- Error (pCi/m <sup>3</sup> )	Condensed Water Vapor (mls)
S-4	5	61	-0.31	1.08	165
S-5	3	44	-1.04	1.08	126
S-16	5	81	0.70	1.13	219

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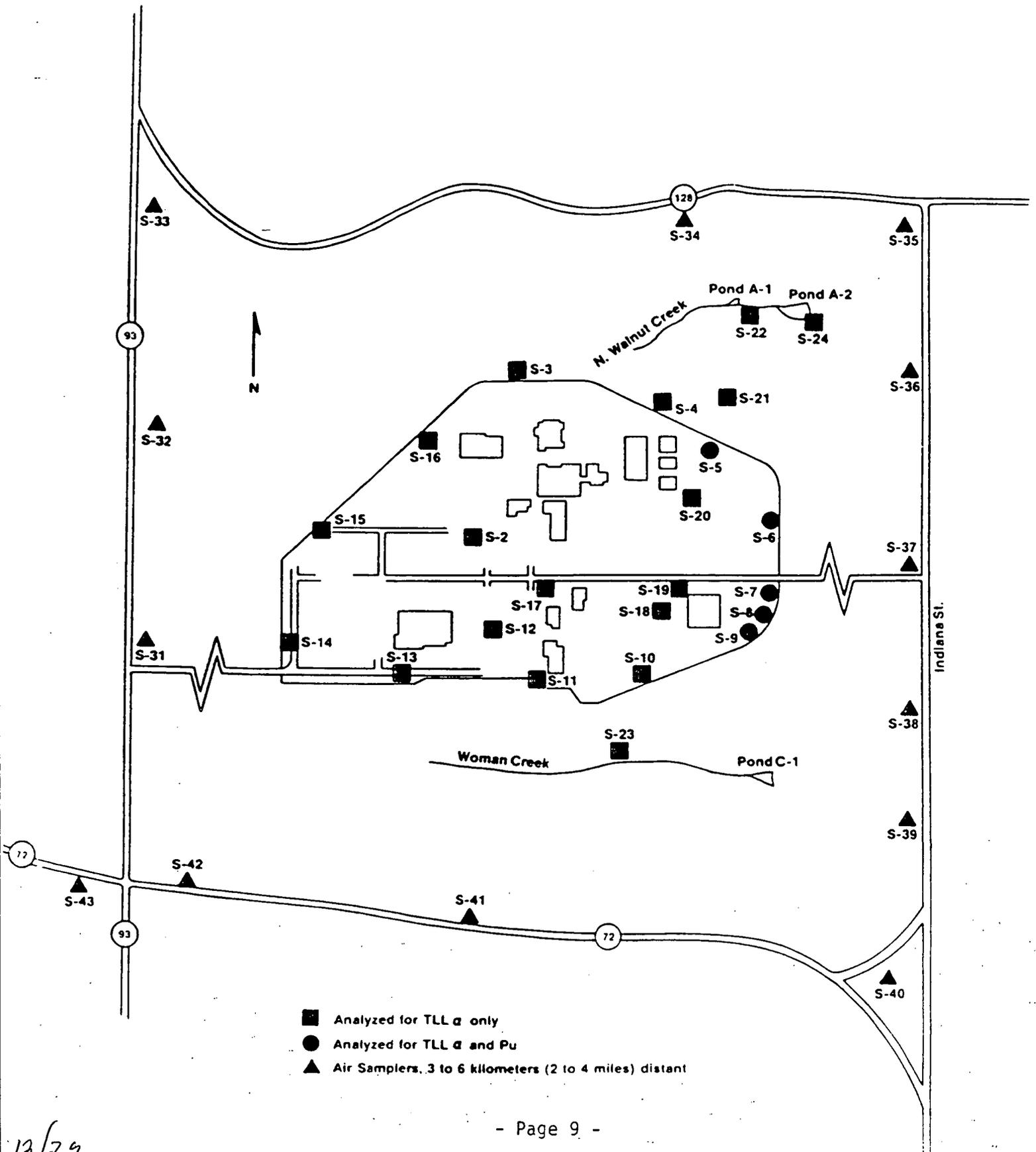
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Table V. Plutonium in Perimeter Ambient Air  
(08/04/87-09/01/87)

Location	n	Volume(m <sup>3</sup> )	Concentration(pCi/m <sup>3</sup> )		
			Lower Confidence Limit	Point Estimate	Upper Confidence Limit
S-31	1	29,000	0.000010	0.000013	0.000016
S-32	1	23,000	-0.000003	0.000000	0.000003
S-33	1	27,000	-0.000002	0.000000	0.000002
S-34	1	24,000	0.000232	0.000263	0.000294
S-35	1	21,000	-0.000003	0.000000	0.000003
S-36	1	28,000	0.000000	0.000002	0.000004
S-37	1	29,000	0.000004	0.000006	0.000008
S-38	1	28,000	0.000001	0.000003	0.000005
S-39	1	31,000	-0.000002	0.000000	0.000002
S-40	1	21,000	-0.000002	0.000001	0.000004
S-41	1	31,000	0.000003	0.000005	0.000007
S-42	1	30,000	-0.000002	0.000000	0.000002
S-43	1	32,000	-0.000002	0.000000	0.000002
S-44	1	28,000	-0.000002	0.000000	0.000002
Mean Point Estimate =				0.000021	

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Location of Onsite and Plant Perimeter Ambient Air Samplers  
 (Portions of figure are not to scale.)

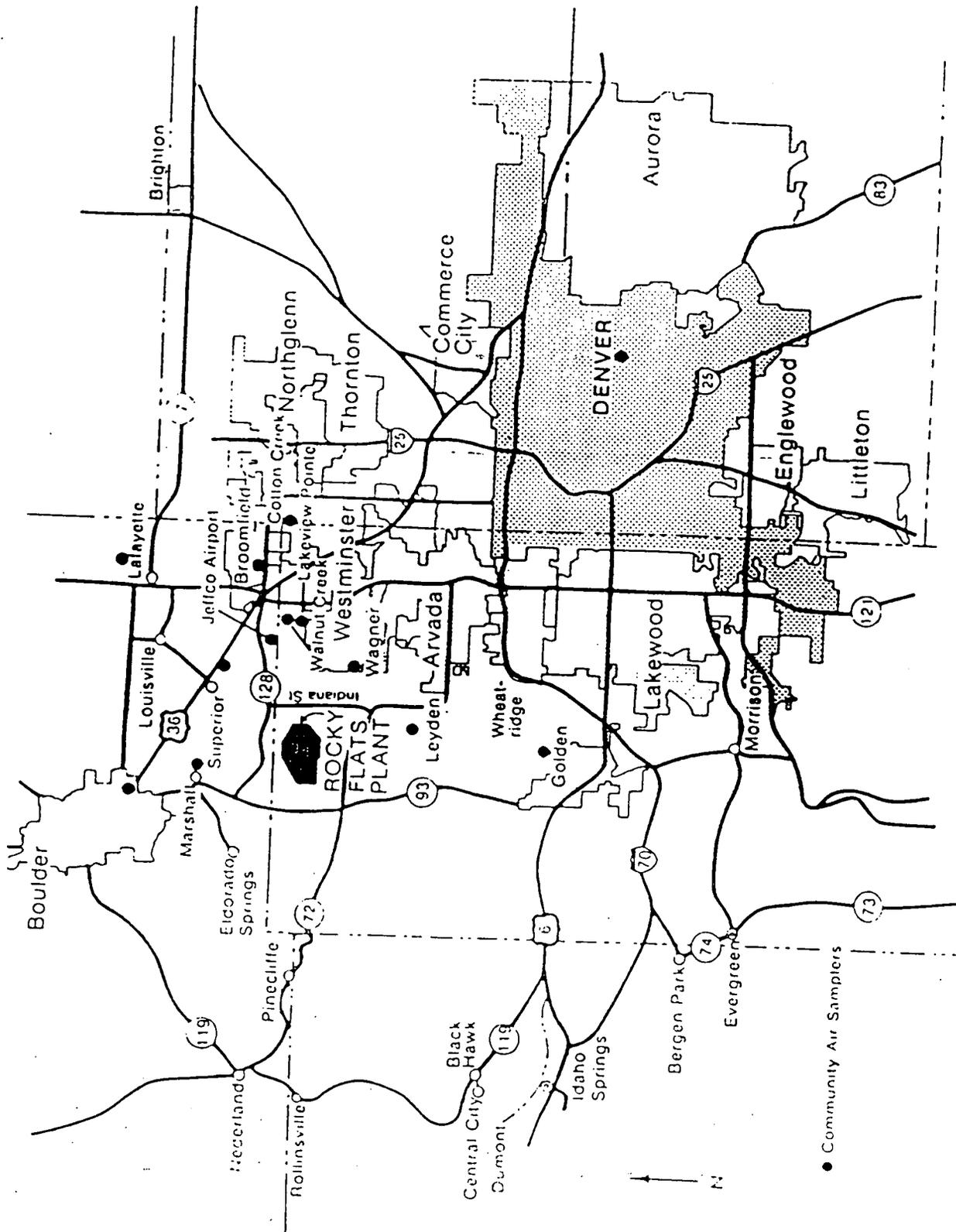


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Table VI. Plutonium in Community Ambient Air  
(08/05/87-09/02/87)

Location	n	Volume(m <sup>3</sup> )	Concentration(pCi/m <sup>3</sup> )		
			Lower Confidence Limit	Point Estimate	Upper Confidence Limit
Marshall	1	27,000	-0.000001	0.000001	0.000003
Jeffco Airport	1	26,000	0.000001	0.000004	0.000007
Superior	1	27,000	0.000001	0.000003	0.000005
Boulder	1	27,000	-0.000001	0.000001	0.000003
Lafayette	1	26,000	-0.000001	0.000001	0.000003
Broomfield	1	22,000	-0.000001	0.000002	0.000005
Walnut Creek	1	29,000	-0.000002	0.000000	0.000002
Wagner	1	29,000	0.000004	0.000006	0.000008
Leyden	1	24,000	0.000000	0.000003	0.000006
Westminster	1	20,000	-0.000003	0.000000	0.000003
Denver	1	30,000	0.000003	0.000005	0.000007
Golden	1	29,000	-0.000001	0.000001	0.000003
Lakeview Pointe	1	21,000	-0.000003	0.000000	0.000003
Cotton Creek	1	25,000	0.000000	0.000003	0.000006
Mean Point Estimate				0.000002	

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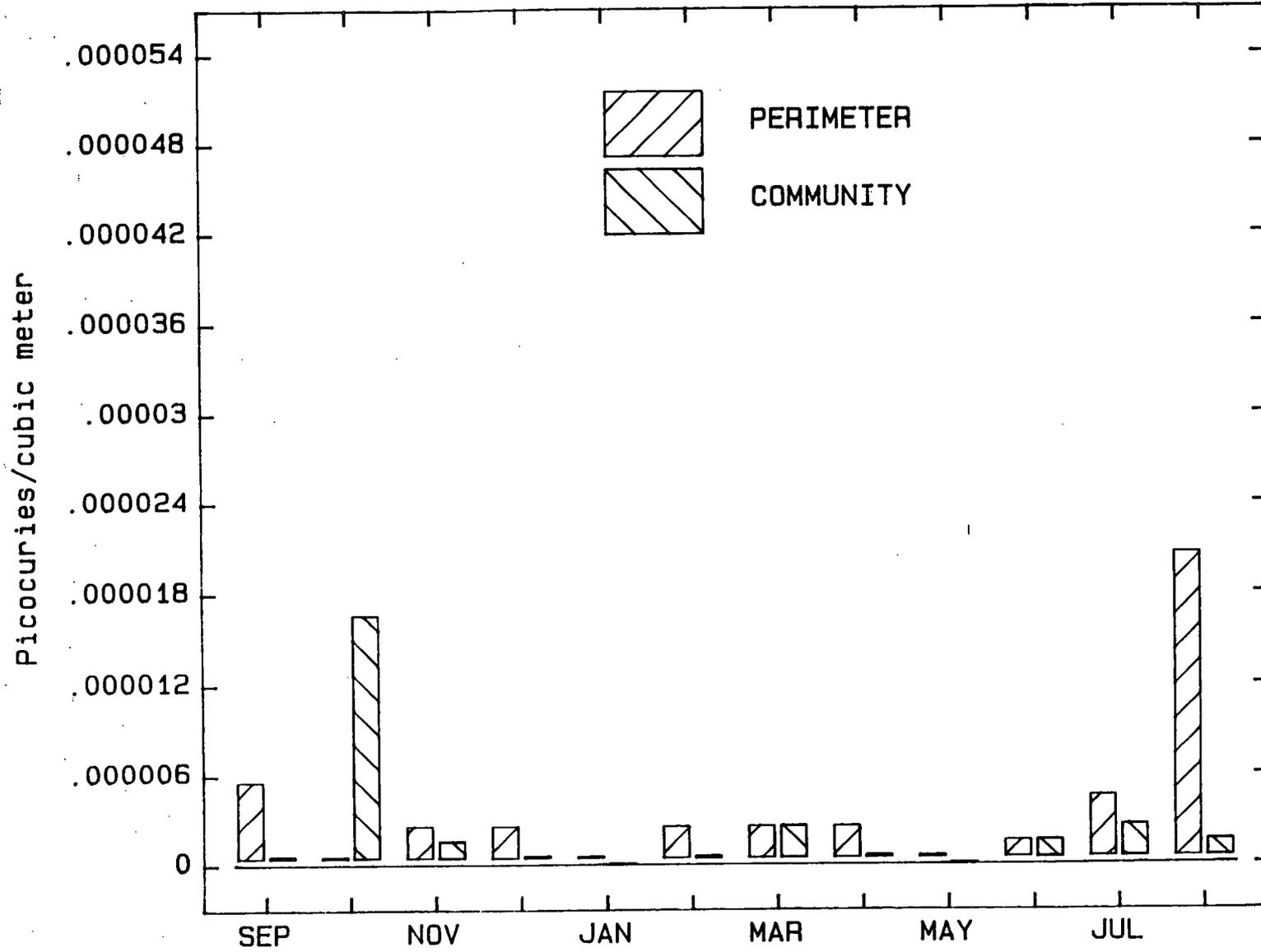


Location of Community Ambient Air Samplers

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### PLUTONIUM IN PERIMETER AND COMMUNITY AMBIENT AIR



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Table VII. Water Sample Results, Radioactive Parameters

Holding Pond Outfall (pCi/l)

<u>Location</u>	<u>Plutonium</u>	<u>Uranium</u>	<u>Americium</u>
<u>Pond A-4</u>			
08/19/87 - 08/21/87	0.00 ± 0.02	13 ± 1	0.01 ± 0.02
Average Concentration	0.00 ± 0.02	13 ± 1	0.01 ± 0.02
<u>Pond B-5</u>			
08/19/87 - 08/21/87	0.04 ± 0.03	5.1 ± 0.5	0.00 ± 0.02
Average Concentration	0.04 ± 0.03	5.1 ± 0.5	0.00 ± 0.02
<u>Pond C-1</u>			
07/31/87 - 08/07/87	0.05 ± 0.03	3.8 ± 0.4	0.03 ± 0.01
08/07/87 - 08/14/87	-----	NO FLOW-----	-----
08/14/87 - 08/21/87	-----	NO FLOW-----	-----
08/21/87 - 08/28/87	0.02 ± 0.03	2.1 ± 0.2	0.03 ± 0.02
Average Concentration	0.03 ± 0.02	3.0 ± 0.2	0.03 ± 0.01

Pond C-2

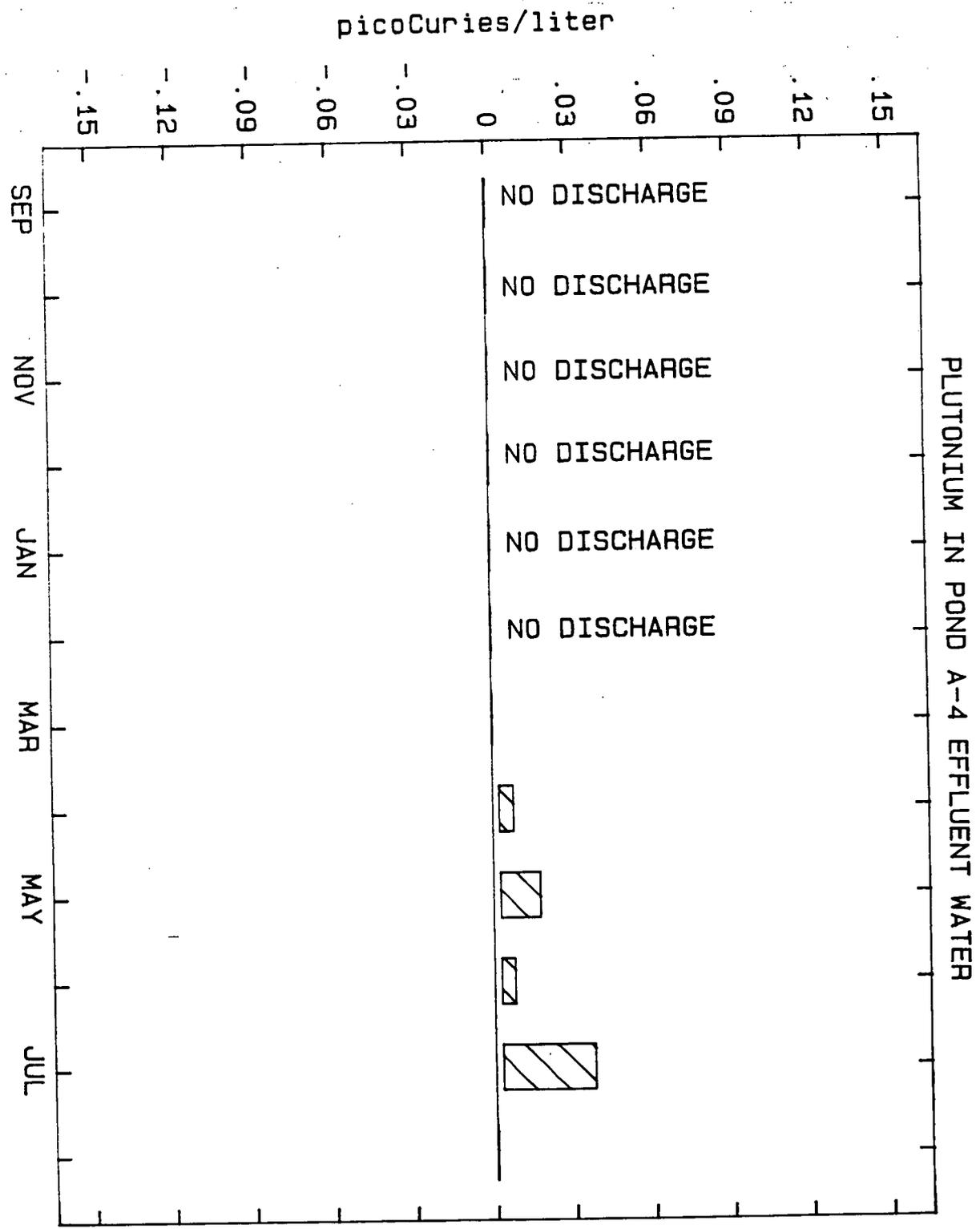
No Discharge

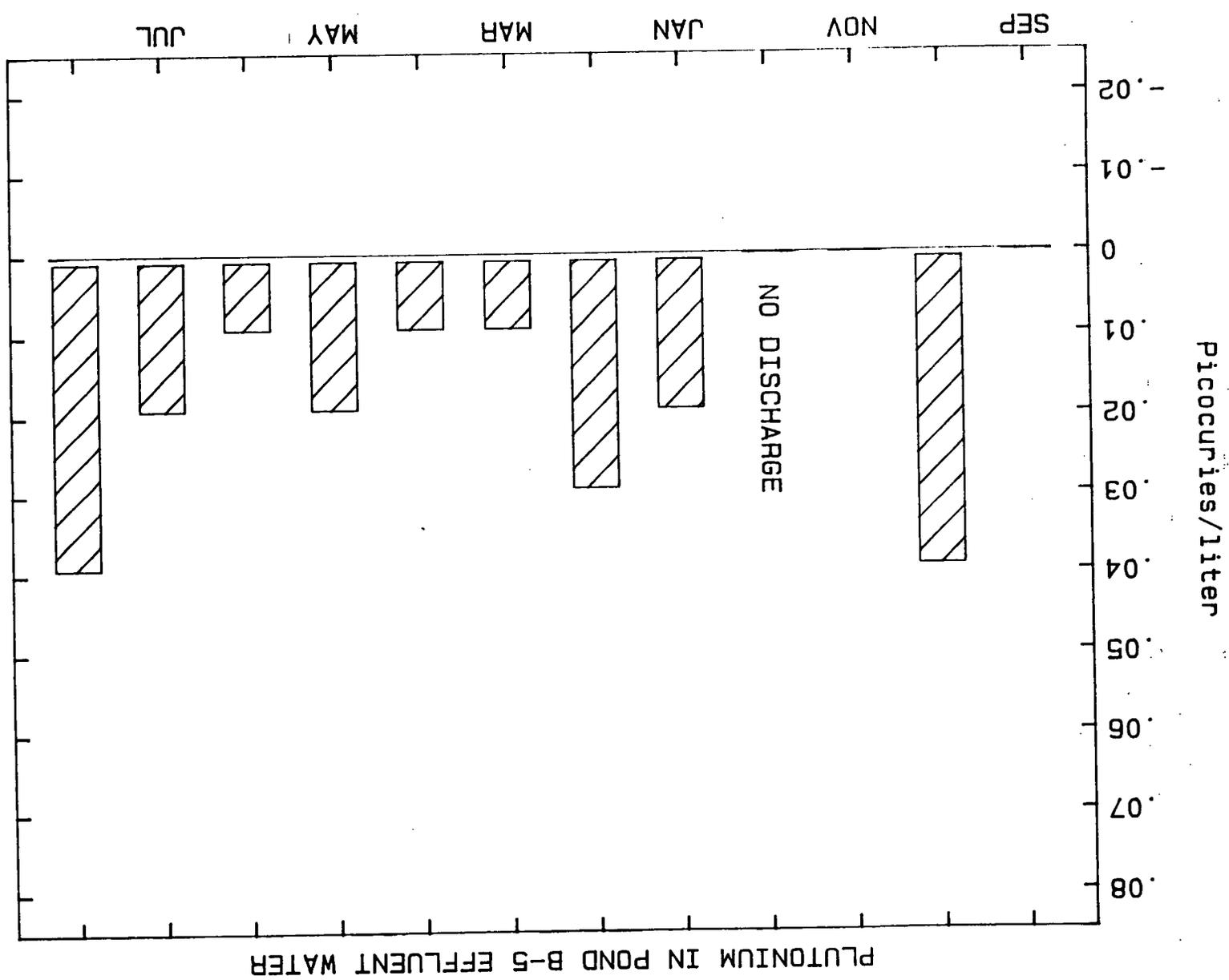
Walnut Creek at Indiana

07/31/87 - 08/07/87	-----	NO FLOW-----	-----
08/07/87 - 08/14/87	-----	NO FLOW-----	-----
08/14/87 - 08/21/87	0.01 ± 0.03	10 ± 1	-0.01 ± 0.02
08/21/87 - 08/28/87	7.1 ± 0.08*	11 ± 1	2.1 ± 0.3*
08/28/87 - 09/04/87	0.03 ± 0.03	8.1 ± 0.9	0.01 ± 0.01
Average Concentration	2.4 ± 0.3	9.2 ± 0.6	0.7 ± 0.1

\* This analytical result is suspect. Results of all other air and water sampling data for the month indicate no source for this radioactivity concentration. A rerun of the residual sample water showed no comparable radioactivity concentration; however, the sample volume available to rerun the analysis was insufficient to provide conclusive data to reject the original analytical results.

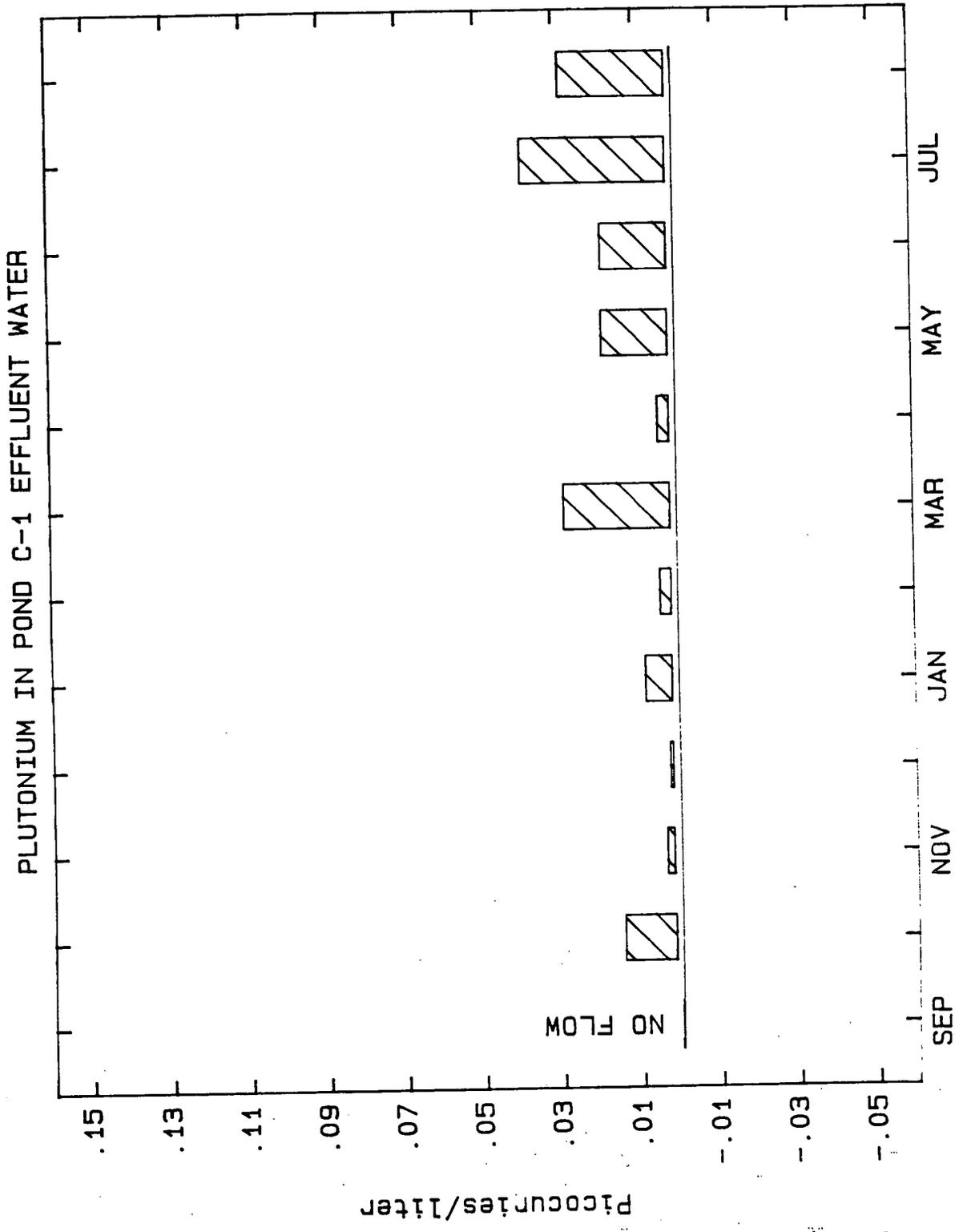
17/29



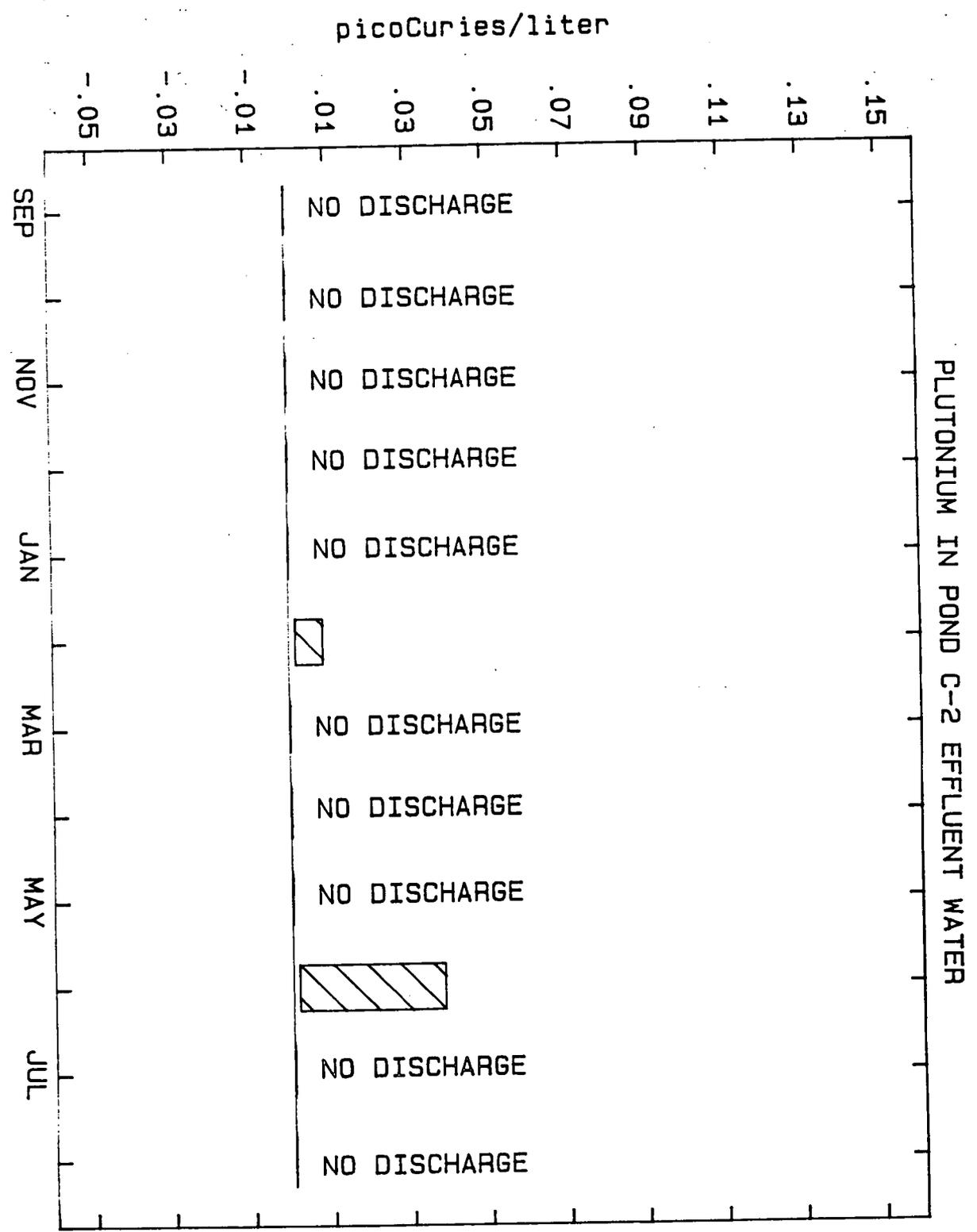


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PLUTONIUM IN POND C-1 EFFLUENT WATER

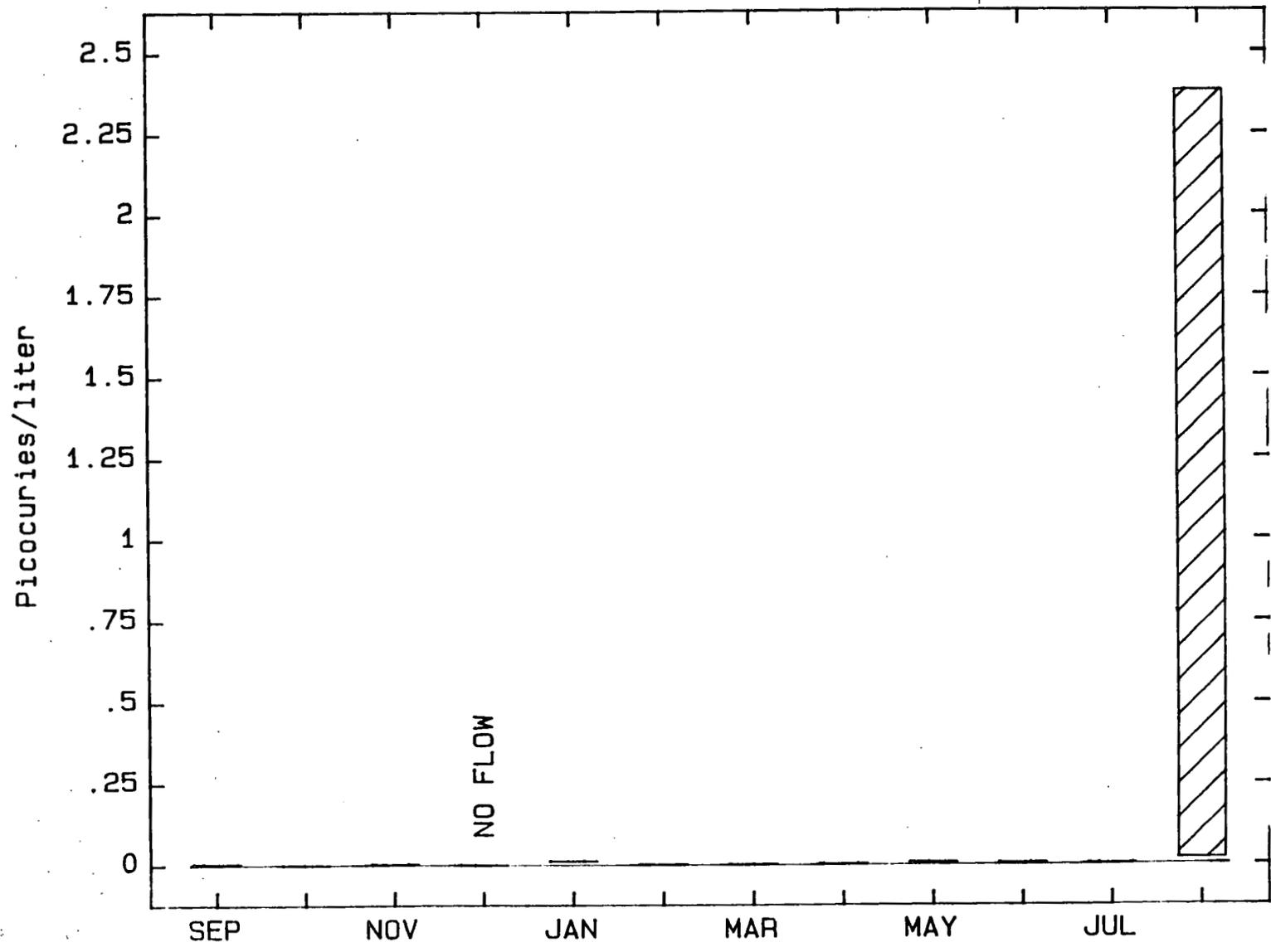


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### PLUTONIUM IN WALNUT CREEK AT INDIANA WATER



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Table VIII. Water Sample Results, Radioactive Parameters

Reservoirs (pCi/l)

<u>Location</u>	<u>n</u>	<u>Plutonium</u>	<u>Uranium</u>	<u>Americium</u>
Great Western	1*	0.009 $\pm$ 0.007	2.1 $\pm$ 0.2	0.002 $\pm$ 0.005
Standley	1*	0.04 $\pm$ 0.01	1.2 $\pm$ 0.2	0.006 $\pm$ 0.006

Community Tap Water (pCi/l)

<u>Location</u>	<u>n</u>	<u>Plutonium</u>	<u>Uranium</u>	<u>Americium</u>
Boulder	1*	0.02 $\pm$ 0.01	0.05 $\pm$ 0.08	0.02 $\pm$ 0.01
Broomfield	1*	-0.001 $\pm$ 0.006	0.9 $\pm$ 0.1	-0.003 $\pm$ 0.004
Westminster	1*	0.000 $\pm$ 0.006	0.01 $\pm$ 0.04	0.001 $\pm$ 0.005

\* Plutonium, uranium and americium analyses were performed on one sample composited from four weekly grab samples.

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Table IX. Water Sample Results, Radioactive Parameters

Tritium (pCi/l)

<u>Location</u>	<u>n</u>	<u>C<sub>Minimum</sub></u>	<u>C<sub>Maximum</sub></u>	<u>C<sub>Average</sub></u>
Pond A-4	2	-200 ± 400	-100 ± 400	-100 ± 300
Pond B-5	3	-600 ± 400	-300 ± 400	-500 ± 200
Pond C-1	2	100 ± 400	300 ± 500	200 ± 300
Pond C-2	0	No Discharge		
Walnut Creek at Indiana	2	-400 ± 400	-300 ± 400	-300 ± 300
Boulder	4	-300 ± 400	400 ± 500	0 ± 200
Broomfield	4	-500 ± 400	1000 ± 500	100 ± 200
Great Western	4	-200 ± 400	400 ± 500	100 ± 200
Standley	4	-300 ± 400	400 ± 400	100 ± 200
Westminster	4	-500 ± 400	800 ± 500	0 ± 200

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Table X. Water Sample Results, Nonradioactive Parameters

Nitrate (as N) at Great Western Reservoir

<u>Sample Date</u>	<u>Nitrate (as N) (mg/l)</u>
08/07/87	<0.2
08/13/87	<0.2
08/20/87	<0.2
08/27/87	<0.2

Nitrate (as N) at Standley Lake

<u>Sample Date</u>	<u>Nitrate (as N) (mg/l)</u>
08/07/87	<0.2
08/13/87	<0.2
08/20/87	<0.2
08/27/87	<0.2

NOTE: For some parameters, the concentrations that are measured at or below the minimum detectable concentration (MDC) are assigned to MDC. The less than symbol (<) indicates MDC values and calculated values that include one or more MDC's.

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Table XI. NPDES Permit Water Sample Results

Discharge 001 (Pond B-3)  
Discharged two times

Parameter		30-Day Average	Limits	Daily Maximum	Limits
			30-Day*		Daily
			Average		Maximum
Biochem. Oxygen Demand, 5 Day	mg/l	9.0	10	9.0	25
Total Suspended Solids	mg/l	4.5	30	5.0	NA
Nitrates as N	mg/l	3.1	10	3.7	NA
Total Chromium	mg/l	<0.05	0.05	<0.05	0.1
Total Phosphorus	mg/l	0.6	8	0.7	NA
Oil and Grease, Visual		No visible sheen	NA		NA
Total Residual Chlorine	mg/l	0.1	NA	0.2	0.5
Fecal Coliforms	#/100 ml	<1	200	<1	NA

pH	S.U.	Minimum	Minimum	Maximum	Maximum
		6.8	6.0	6.8	9.0

Discharge 002 (Pond A-3)  
No discharge

Parameters		30-Day	Limits	Daily	Limits
		Average	30-Day*	Maximum	Daily
			Average		Maximum
Nitrates as N	mg/l		10		20
pH	S.U.	Minimum	Maximum	Minimum	Maximum
			6.0		9.0

Discharge 003 (RO Pilot Plant)  
No Discharge

pH	S.U.	Minimum	Minimum	Maximum	Maximum
			6.0		9.0

Discharge 004 (RO Plant)  
No Discharge

Total Suspended Solids	mg/l	30-Day	Limits	Daily	Limits
		Average	30-Day*	Maximum	Daily
			Average		Maximum
Total Suspended Solids	mg/l		15		25
Total Organic Compounds	mg/l		22		30
Total Phosphorus	mg/l		8		12
Nitrates as N	mg/l		10		20
Total Chromium	mg/l		0.05		0.1
Total Residual Chlorine	mg/l		NA		0.5
Fecal Coliform	#/100 ml	7-Day	7-Day	30-Day	30-Day
		Average	Average	Average	Average
			400		200
pH	S.U.	Minimum	Minimum	Maximum	Maximum
			6.0		9.0

\* This limitation applies when a minimum of 3 consecutive samples are taken during separate weeks.

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Tables XI. NPDES Permit Water Sample Results (Continued)

Discharge 005 (Pond A-4)

<u>Parameter</u>		<u>n</u>	<u>C<sub>Minimum</sub></u>	<u>C<sub>Maximum</sub></u>	<u>C<sub>Average</sub></u>
pH	S.U.	2	7.7	8.1	-
Nitrates as N	mg/l	2	<0.2	<0.2	<0.2
Nonvolatile Suspended Solids	mg/l	2	1.0	2.0	1.5

Discharge 006 (Pond B-5)

<u>Parameter</u>		<u>n</u>	<u>C<sub>Minimum</sub></u>	<u>C<sub>Maximum</sub></u>	<u>C<sub>Average</sub></u>
pH	S.U.	3	7.20	8.30	-
Nitrates as N	mg/l	3	<0.2	<0.2	<0.2
Nonvolatile Suspended Solids	mg/l	3	1.0	20.0	8.7

Discharge 007 (Pond C-2)

No Discharge

<u>Parameter</u>		<u>n</u>	<u>C<sub>Minimum</sub></u>	<u>C<sub>Maximum</sub></u>	<u>C<sub>Average</sub></u>
pH	S.U.				
Nitrates as N	mg/l				
Nonvolatile Suspended solids	mg/l				

Table XII. Water Sample Results, Nonradioactive Parameters

Walnut Creek at Indiana Street

<u>Parameter</u>		<u>n</u>	<u>C<sub>Minimum</sub></u>	<u>C<sub>Maximum</sub></u>	<u>C<sub>Average</sub></u>
pH	S.U.	3	6.80	7.00	-
Nitrates as N	mg/l	3	<0.2	0.4	<0.3

Total Volume (gallons) = 16,667,000

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Table XII.  
 Daily Flow Data Recorded at the  
 Walnut Creek at Indiana Gauging Station,  
 Ponds A-4 and B-5 during August, 1987

<u>Date</u>	<u>Walnut Creek at Indiana (gallons)</u>	<u>Pond A-4 (gallons)</u>	<u>Pond B-5 (gallons)</u>
8/03/87	-	-	-
8/04/87	28,000	-	-
8/05/87	-	-	-
8/06/87	-	-	-
8/07/87	-	-	-
8/10/87	-	-	-
8/11/87	-	-	-
8/12/87	-	-	-
8/13/87	-	-	-
8/14/87	-	-	-
8/17/87	-	-	-
8/18/87	-	-	-
8/19/87	-	4,693,000	6,022,000
8/20/87	15,931,000	2,694,000	1,417,000
8/21/87	699,000	-	-
8/24/87	7,000	-	-
8/25/87	-	-	-
8/26/87	-	-	-
8/27/87	-	-	-
8/28/87	2,000	-	-
8/31/87	-	-	-
Total Volume	16,667,000	7,387,000	7,439,000

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Table XIII.  
 Daily Flow Data Recorded at  
 Ponds C-1 and C-2 during August, 1987  
 (Woman Creek)

<u>Date</u>	<u>Pond C-1 (gallons)</u>	<u>Pond C-2 (gallons)</u>
8/03/87	2,000	-
8/04/87	-	-
8/05/87	-	-
8/06/87	-	-
8/07/87	-	-
8/10/87	-	-
8/11/87	-	-
8/12/87	-	-
8/13/87	-	-
8/14/87	-	-
8/17/87	-	-
8/18/87	-	-
8/19/87	-	-
8/20/87	-	-
8/21/87	-	-
8/24/87	-	-
8/25/87	-	-
8/26/87	-	-
8/27/87	-	-
8/28/87	635,000	-
8/31/87	681,000	-
Total Volume	1,318,000	-

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